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DOE STANDARD

GUIDELINE TO GOOD PRACTICES FOR SEASONAL FACILITY PRESERVATION AT DOE NUCLEAR FACILITIES

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AREA MNTY

FOREWORD

The *Guideline to Good Practices for Seasonal Facility Preservation at DOE Nuclear Facilities* provides contractor maintenance organizations with information which may be used for the development and implementation of a seasonal facility preservation plan developed for maintenance organizations at DOE (Department of Energy) nuclear facilities. This document is intended to be an example guideline for the implementation of DOE Order 4330.4A, *Maintenance Management Program,* Chapter II, Element 19.1, *Seasonal Facility Preservation Requirements.* DOE contractors should not feel obligated to adopt all parts of this guide. Rather, they should use the information contained herein as a guide for establishing processes applicable to their facility.

CONTENTS

1. INTRODUCTION

1.1 Purpose

This guide is intended to assist facility maintenance organizations in the review of existing methods and in the development of new methods for establishing a maintenance Seasonal Facility Preservation program. It is expected that each DOE facility may use approaches or methods different from those defined in this guide. The specific guidelines that follow reflect generally accepted industry practices. Therefore, deviation from any particular guideline would not, in itself, indicate a problem. If substantive differences exist between the intent of this guideline and actual practice, management should evaluate current practice to determine the need to include/exclude proposed features. A change in maintenance practice would be appropriate if a performance weakness were determined to exist. The development, documentation, and implementation of other features that further enhance these guidelines for specific applications are encouraged.

Additional information pertinent to the implementation of this guideline may be found in DOE-STD-1072-93, *"Guidelines to Good Practices for Facility Condition Inspections at DOE Nuclear Facilities."*

Appendix B (Sample Lesson Plan) is provided for use by facility trainers who provide training regarding this element of DOE Order 4330.4A, "Maintenance Management Program."

1.2 Background

The information in this guide was developed from commercial and DOE sources. Each facility should select any details applicable, add any additional knowledge or experience that is applicable, and then develop and implement facility-specific methods for establishing applicable maintenance processes. Facilities which use existing documented methods should review this guide to identify any details which may enhance their existing process.

1.3 Application

The content of this guide is generally applicable to all DOE nuclear facilities. Portions of the methods outlined may not be applicable to all facilities, because maintenance organizations, disciplines, titles, and responsibilities may vary among DOE nuclear facilities. Facility maintenance personnel should (1) verify the adequacy of or (2) improve existing methods by adapting this guide to their specific facility and individual maintenance disciplines.

2. DEFINITIONS

2.1 Acronyms

DOE: Department of Energy

MJR's: Maintenance Job Requests

PM: Preventive Maintenance

2.2 Hurricane Watch: Alerts an area of a possible hurricane within the next several days. It is observed and detected by abnormal wind disturbances and/or low pressure areas moving toward a fixed area.

2.3 Hurricane Warning: Issued when winds are expected to be greater than 74 mph within the next 24 hours. There may be heavy rain or high water, or a combination of these.

2.4 Tornado Watch: Meteorological conditions are favorable for the formation of a tornado. These watches are usually for a period of time not exceeding 4 hours.

2.5 Tornado Warning: Issued when a tornado has been sighted in the area.

3. SEASONAL FACILITY PRESERVATION

3.1 Discussion

The fundamental objective of an effective seasonal facility preservation plan should be to ensure continued safe facility operations. This objective requires that appropriate controls be established for inspections and self-assessments of seasonal facility preservation plans to ensure correction of deficiencies or preparation of other compensatory measures to protect DOE nuclear facilities.

The plan should clearly define responsibilities, accountabilities, and interfaces for each functional organization supporting each step in the plan. A seasonal facility preservation plan, as a minimum, should include the following elements:

- Cold weather preparation including freezing conditions, hail, snow, and ice
- Flash floods
- Hurricane watches and warnings
- Tornado watches and warnings (High Winds)
- Extreme hot/dry weather

NOTE: Plant status at the time a severe weather condition exist should dictate actions required to place the plant in a state of readiness for seasonal facility preservation.

Building Managers should consider seasonal related problems as priority and take immediate corrective action to minimize damage.

Appendix A may be used as an example checklist for Cold Weather conditions.

3.2 Scope

This guideline applies to seasonal facility preservation plan activities involving maintenance organizations throughout.

3.3 Responsibilities

3.3.1 Owner/Operators are responsible for:

3.3.1.1 the regular evaluation of seasonal facility preservation plan activities involving maintenance organizations to determine and implement enhancement/improvement opportunities in a timely manner;

3.3.1.2 making decisions to temporarily curtail operations (safe shutdown) of a facility identified as having a high probability for sustaining damage when subjected to unusually severe weather conditions;

3.3.1.3 identifying personnel to be evacuated during severe weather conditions and ensuring any such evacuation is carried out in accordance with approved emergency procedures;

3.3.1.4 ensuring that adequate seasonal weather protection plans are validated, verified, approved, and implemented.

3.3.1.5 assuring predetermined operational changes are executed to protect equipment and facilities assigned as their area of responsibility involving modification of equipment set-ups or shut down/start-up of equipment as required to ensure protection from potential damage and to minimize loads on power distribution lines;

3.3.1.6 operation of all primary heating, ventilating and air conditioning building equipment which may affect ambient temperatures in any facility susceptible to seasonal damage. Secondary equipment such as unit heaters and desk heaters may be operated by others.

3.3.1.7 ensuring preventive maintenance (PM) is current for emergency diesel generators, uninterruptible power supplies, and plant battery banks to ensure operability when severe weather conditions are expected;

3.3.1.8 inspecting for damage and initiating repairs during and/or following severe weather conditions;

3.3.1.9 secure operations for safe shutdown of critical systems.

3.3.2 Building Managers are responsible for:

3.3.2.1 examining all facilities and equipment assigned to their area of responsibility on a seasonal basis. This may be included in the Facility Condition Inspection process in accordance with DOE-STD-1072-93, *"Guideline to Good Practices for Facility Condition Inspections at DOE Nuclear Facilities."*

3.3.2.2 identifying facilities having a high probability for sustaining damage when subjected to unusually severe weather conditions;

3.3.2.3 monitoring their assigned facilities for protection and assuring any necessary on-site actions are taken and/or correct personnel are notified to protect equipment and facilities assigned to their area of responsibility;

3.3.2.4 monitoring conditions in climate sensitive areas during normal daytime operations;

3.3.2.5 identifying deficiencies requiring repair or modification in order to mitigate/prevent problems;

3.3.2.6 verifying routine actions are taken annually prior to seasonal hazards to provide protection for their assigned areas of responsibility;

3.3.2.7 initiating necessary damage inspections and applicable repairs following severe weather conditions;

3.3.2.8 identifying and submitting corrective actions on deficiencies requiring repair or modification to systems/equipment in order to prevent "seasonal hazard" problems and to ensure that, in extreme (high/low) temperature conditions, proper operation of equipment is maintained within their assigned areas of responsibility.

3.3.3 Maintenance Supervisors are responsible for:

3.3.3.1 scheduling craft activities to correct previously identified deficiencies that may lead to seasonal hazard problems, which prevent proper system/equipment operation in extreme (high/low) temperature conditions;

3.3.3.2 maintaining a "crew call-in list" for maintenance crews to respond to specific seasonal hazard related problems;

3.3.3.3 for accomplishing scheduled Preventive Maintenance (PM) job requests, repairs and/or modifications to correct deficiencies that may lead to seasonal hazard problems, which prevent proper system/equipment operation in extreme (high/low) temperature conditions;

3.3.3.4 inspecting the on-going job sites for loose materials and debris which may become missiles in a strong wind and secure them to the maximum extent possible;

3.3.3.5 ensuring freestanding materials or objects in staging/laydown areas have been tied and anchored or moved inside buildings to the maximum extent practical;

3.3.3.6 ensuring adequate foul weather gear, tools, and equipment are available for use in the applicable seasonal hazard;

3.3.3.7 regularly evaluating emergency diesel generators, uninterruptable power supplies, and plant battery banks to ensure operability when severe weather conditions are expected.

3.4 Seasonal Facility Preservation Plan

Plans should be developed, implemented and documented to prevent equipment and building damage at DOE facilities, due to the seasonal weather conditions listed in Section 3.1. A task team should be established to provide for the development and implementation of policies, goals, and objectives for severe weather protection plans. Buildings and equipment with the potential for damage due to seasonal weather should be identified and a risk assessment based on the graded approach should be conducted. The plan should include contingencies for the critical facilities or equipment which are likely to sustain damage when seasonal weather conditions are expected. The plan should ensure that, in all cases, the preparatory actions and requirements imposed to provide seasonal weather protection, particularly those taken to restrict safety system functions, are reviewed by facility operations and safety personnel prior to implementation to ensure that the facility is maintained in a safe condition to protect the health and safety of the public.

As a minimum, this plan should include:

- A checklist for Building Managers to ensure the implementation of actions prior to seasonal weather to provide protection for their assigned areas of responsibility.

- Identification of items requiring major modifications or redesign to mitigate/prevent equipment damage. For items which may not be changed prior to the upcoming seasonal weather condition, interim actions should be taken to prevent equipment damage.

- Specific responsibilities for the operations staff and Building Managers for monitoring the temperatures in facilities' on and off shifts, including weekends and holidays.

- Alerting of personnel and providing increased surveillance in periods of extreme, unusual, or extended seasonal weather conditions. Maintenance personnel should be on call to respond to such events.

- Adequate foul weather gear, tools, and equipment are available for use for emergency and operations personnel.

- The recalibration of exposed instrument loops when instrument lines or transmitters are subjected to severe seasonal weather conditions.

- A review of the status of safety related equipment during seasonal weather conditions and ensure inoperable equipment is available for return to service, if possible.

- A review of surveillance schedules and considerations given to performing surveillances early if possible or delaying them until after the seasonal weather condition passes if permitted to minimize equipment out of service.

- Inspection of outside areas for loose materials and debris, which may become missiles in a strong wind, and securing to the maximum extent possible.

- The availability of adequate lumber and other supplies for wind protection or damage control.

- Verification of operability and availability of communications equipment.

- Identification of plant vehicles needed for emergency use and ensure vehicles have a full tank of fuel and are in good repair.

- The availability of equipment for making emergency repairs.

- Ensuring materials susceptible to severe weather damage are properly stored and protected.

- Ensuring the protection of accumulation site waste containers and bulk chemicals from potential damage as a result of seasonal hazards.

- Ensuring all building doors and windows can be properly secured.

- Provisions are made to remove seasonal weather protection features after the weather season is over with appropriate verification and documentation of return to normal service through the facilities configuration management system. (An example related to cold weather is given in Appendix A.)

3.4.1 Cold Weather Preparation

In addition to the list of items in Section 3.4 above, the following should be included to minimize equipment and building damage due to cold weather conditions, temperatures $\leq$ than 35° F, including freeze protection, hail, snow, and ice.

- Identification of areas where portable heating may be required and attaining portable heating equipment, approved by the fire protection engineering group.

- Monitoring the conditions surrounding fire protection sprinkler systems to ensure a temperature of above 40° F is maintained.

- Ensuring air intakes, windows, doors and any other access which may result in abnormal inflow of cold air into an area susceptible to freeze damage are secured.

- Heating systems are cleaned, serviced, and functionally tested.

- Antifreeze used in cooling systems is checked and replaced as necessary.

- Heating system power and temperature controls are protected against inadvertent deactivation.

- Systems requiring or deserving special protection due to hazards or costs associated with freeze damage have temperature alarms and/or automatic backup heat sources.

- Facility personnel should inspect, test, and stage portable auxiliary heaters and have identified sources to obtain more, if needed. Personnel should be trained in the safe use of portable heaters.

- The main water supply cutoffs for each critical facility is identified, tested, and readily accessible to emergency personnel responding to a freeze/thaw incident.

- Outside storage pads and unheated storage areas are inspected to ensure that there are no materials susceptible to freeze damage.

- Implementation of snow and ice removal activities.

- Employees are aware of the need to identify and report any suspected problem with heating or other cold weather protection equipment (i.e., non-insulated water or process pipes, steam trace heaters valved off, electrical trace heaters turned off or burned out, broken windows, holes in exterior walls, etc.).

- The removal of freeze protection equipment from service during the seasonal freeze period should be carefully evaluated.

- Wet-pipe sprinkler systems are reviewed for areas susceptible to freezing, and appropriate actions planned, such as provisions for auxiliary heat; draining and posting a fire watch; etc.

- The availability and use of salt, sand, and “ice-chaser” as needed.

- Outside areas are inspected to ensure that gutters and downspouts are provided where there is a potential for ice buildup that may restrict egress.

3.4.2 Flash Floods

In addition to the list of items in Section 3.4 above, the following should be included to minimize equipment and building damage due to flash flooding.

- Doors and windows closed,
- The use of tarp over vulnerable items,
- Ensuring storm drains are kept clear of debris,
- The use of sandbags and dikes,
- Raising water vulnerable items above the expected water line, and
- Ensure all vehicles are parked/moved to high ground as necessary.

3.4.3 Hurricane Watches and Warnings

In addition to the list of items in Section 3.4 above, and Section 3.4.2, *Flash Floods,* the items listed below should be included to minimize equipment and building damage due to a hurricane.

- Ensure windows have been boarded up or taped as necessary during a hurricane watch;
- Safe shutdown of vulnerable equipment;
- Emergency evacuation policies and routes.

3.4.4 Tornado Watches and Warnings (High Winds)

In addition to the list of items in Section 3.4 above and Section 3.4.2, *Flash Floods,* the following should be included to minimize equipment and building damage due to a tornado.

- Safe shutdown of vulnerable equipment; and
- Emergency evacuation policies and routes.

3.4.5 Extreme Hot/Dry Weather

In addition to the guidelines listed in Section 3.4 above, the following should be included to minimize equipment and building damage due to extreme hot/dry weather.

- Safe shutdown of vulnerable equipment;
- Restrict operations which involve heat (welding, burning, sparks, etc.);
- Restrict fire hazards (smoking, etc.);
- Ensure an ample supply of portable fire extinguishers are available;
- Ensure the fire protection personnel are alerted; and
- Verify all exits are kept clear.

APPENDIX A

EXAMPLE COLD WEATHER CHECKLIST

APPENDIX A
COLD WEATHER CHECKLIST

SEPTEMBER

Building Managers	Increase surveillance of assigned facilities to identify areas having a high probability for sustaining freeze damage. Generate Standing Work Orders or MJR's for corrective action.
Maintenance Department	Increase surveillance of facilities to identify areas having a high probability for sustaining weather related damage. Generate MJR's for corrective action.
	Check status of winter and foul weather gear, tools, and equipment for personnel required to work outdoors.
	Plan and schedule final outages on main steam system(s).
	Coordinate semi-annual boiler inspections.
	Plan and schedule seasonal facility preservation MJR's and PM job request.

OCTOBER

Facility Manager	Annual reminder to the plant of seasonal facility preservation precautions.
Building Managers	Coordinate with Maintenance Managers to assure timely scheduling and completion of seasonal facility preservation related MJR's.
Maintenance Department	Complete semi-annual boiler inspections.
	Complete maintenance activities requiring outages of main steam system.
	Request extended work week for the shops involved in seasonal facility preservation maintenance activities, if required.
	Ensure a "crew call-in list" is available for maintenance crews to respond to cold weather related problems.
	Complete execution of cold weather related MJR's and PM job request.

APPENDIX A
COLD WEATHER CHECKLIST

MARCH

Building Managers	Increase surveillance of assigned facilities in anticipation of the Spring season. Generate Standing Work Orders and/or MJR's for corrective action.
Maintenance Department	Plan, schedule, and begin execution of Standing Work Orders and/or MJR's relating to the Spring season.
	Schedule PM job request related to the Spring season.

APRIL

Building Managers	Coordinate with the Maintenance Department to schedule and execute freeze protection/prevention Standing Work Orders and/or MJR's which require close down or turn around work during the warm weather season.
Maintenance Department	Plan, schedule, and execute freeze protection/prevention Standing Work Orders and/or MJR's which require close down or turn around work during the warm weather season.
	Continue execution of MJR's and PM relating to Spring/Summer Operations.

APPENDIX B
SEASONAL FACILITY PRESERVATION

SAMPLE LESSON PLAN

SEASONAL FACILITY PRESERVATION

SAMPLE LESSON PLAN

LESSON PLAN

1. The instructor should be familiar with the following background information:

   a. The primary purpose of seasonal facility preservation should be to ensure safe, reliable plant operations by minimizing damage sustained due to unusually severe weather conditions.

   b. One successful approach to seasonal facility preservation is to establish a plan which includes periodic inspections, corrective actions for identified deficiencies, and follow-ups to ensure deficiency correction.

   c. The involvement of facility maintenance personnel in periodic inspections and walk-downs of plant equipment and areas should help ensure a well-maintained seasonal facility preservation plan.

2. To teach this lesson, the following training housekeeping items are required:

   a. Location for the training,

   b. Approximately 30 minute time period for the training,

   c. Notification of selected employees, and

   d. A copy of the seasonal facility preservation plan.

3. This lesson has the following trainee enabling objective:

   Explain the purpose of a seasonal facility preservation plan.

4. A facility-wide seasonal facility preservation plan is an effective means to identify and correct deficiencies related to severe weather conditions.

   a. Considerations for this type of plan include the following:

      - all personnel should have a clear understanding of the plan,
      - all owner/operators and supervisors should participate in the seasonal facility preservation inspections,
      - inspection areas should be assigned in conjunction with facility condition inspection plans, to cover the entire facility, including out-of-the-way locations,
      - identified deficiencies should be corrected in a timely manner,
      - unauthorized modifications do not exist,
      - identification and monitoring of facilities having a high probability for sustaining damage when subjected to unusually severe weather conditions, and
      - inspection of the job sites for loose materials and debris which may become missiles in a strong wind and removal of them to the maximum extent possible.

   b. In addition to an inspection, all site personnel should be responsible for the prompt identification, correction, or documentation of seasonal facility preservation deficiencies during the normal course of their duties.

5. Discuss with the trainees the facility's seasonal facility preservation plan.

CONCLUDING MATERIAL

Review **Activity:**

DOE
FM
DP
EH
EM
ER
NE
NS
RW

Field Offices
AL
CH
ID
NV
OR
RL
SR
OAK
RF

Area Offices
Amarillo
Brookhaven
Fernald
Kansas City
Kirtlant
Princeton

Facilities
ANL
KC AlliedSignal
NBL
LBL
LANL
LLNL
ORAU
PANTEX M&H
PNL
PPPL
RF-EG&G
SNL
NV REECo.
NV EG&G
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WHC
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RF
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